A Rare Occipital Condyle Fracture in a Patient With a Minor Head Injury

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Occipital condyle fracture (OCF) is an uncommon but potentially fatal disease entity. It is most commonly identified in patients suffering from severe craniocerebral trauma. The advent of computed tomography has made early detection possible. Traditional treatment using a hard neck collar is sufficient to produce solid fusion in most OCF patients. Delayed diagnosis, however, may result in neurologic deterioration due to potential displacement of fractured condylar fragments. Here we report a case of isolated, stable OCF in a patient with a minor head injury. A high level of clinical awareness of this rare disease entity is imperative for the management of traumatized patients, especially for those who have minor head injuries but persistent neck pain.

Key Words: external immobilization, minor head injury, occipital condyle fracture
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Occipital condyle fracture (OCF) is a unique, rare disease entity in the context of craniospinal injuries. Only sporadic cases were reported before the era of computed tomography (CT) imaging, but improvements in CT technology have facilitated the diagnosis of this rare injury. It has been suggested that the exact incidence of OCF in traumatized patients may actually be much higher than previously reported in the literature [1–3].

There are currently insufficient data to establish a diagnostic standard for OCF [1–3]. Patients with OCF usually have nonspecific reports in physical examinations, and plain radiographs also fail to produce a definite diagnosis in most cases. Craniocervical CT imaging examinations are therefore recommended in traumatized patients who may be suffering from this condition, in order to establish a more accurate diagnosis [4,5].

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Patients with OCF may present with signs of instability between the skull base and the upper cervical spine (e.g. quadriplegia and respiratory distress), because of associated ligamentous injury [2,6]. Thus, early diagnosis of OCF is imperative for the management of traumatized patients, because unrecognized craniocervical instability could result in fatal neurovascular catastrophe. Here, we report a rare case of OCF in a patient who experienced a minor head injury.

Case Presentation

A 24-year-old man complained of dull upper neck pain after a motor vehicle crash into a roadside barricade. He was in the driver's seat but was not wearing a seatbelt. The patient experienced transient loss of consciousness at the scene of the accident, but was noted to be alert on admission. Initial physical examinations were unremarkable, except for the presence of left knee contusion. A rapid neurologic checklist revealed no dysfunctions in the cranial nerves or the motor and sensory nervous systems. Plain cervical radiographs revealed no detectable bony lesions.

CT examinations of the brain and cervical spine were subsequently arranged. No evidence of intracranial hemorrhage was found. However, spinal CT showed one bony chip fractured at the junction of the right occipital and atlas bone (Figure A). Further examinations with multiplanar reformatted CT images revealed a left occipital condyle avulsion fracture with slightly medial displacement (Figures B and C). The patient was admitted to our neurosurgical service for neurological observations for 3 days and was treated with a Miami neck collar. No neurologic symptoms or signs were detected during the course of hospitalization. He opted to remove the collar with full understanding of the potential neurologic threats.

At the outpatient follow-up clinic, his neck pain was found to have subsided completely by 2 weeks after the injury. He did not develop any neurologic deficits. Craniocervical CT scans performed at 18 weeks after

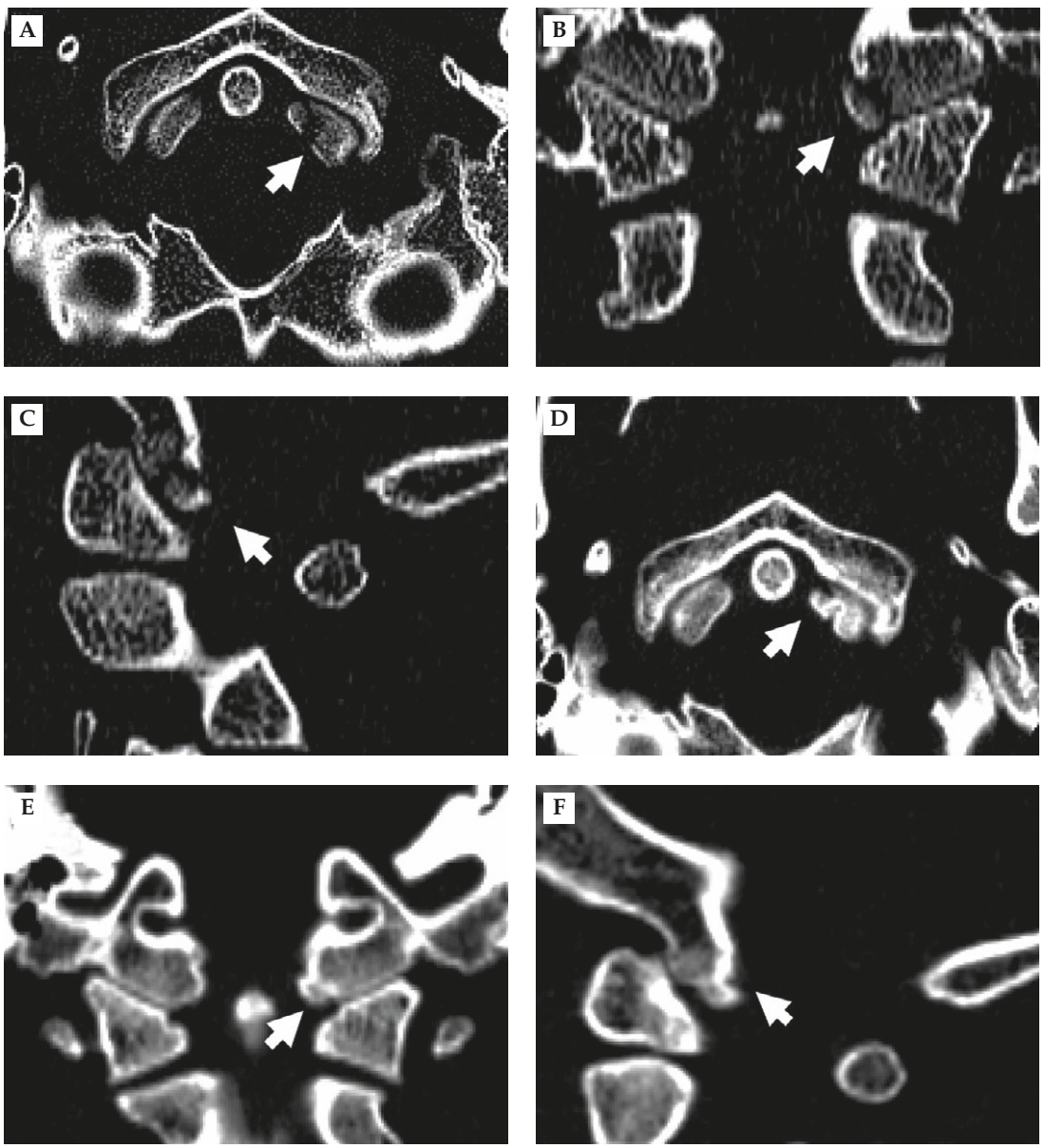

Figure. *Computed tomography (CT) images of the patient with occipital condyle fracture. (A) Initial CT scanning revealed a bony chip from the left occipital condyle (arrow). (B, C) Reformatted CT images showed no medial displacement of the chip (arrows). (D–F) At the follow-ups, CT imaging examinations revealed that a healing process had occurred at the fractured site 18 weeks after the insult (arrows).*

the initial insult revealed that a healing process had occurred at the fractured occipital condyle (Figures D–F). He returned to his previous work with no notable discomfort during a follow-up period of 20 months.

Discussion

Over 80–90% of patients with OCF lesions were reported to have associated craniocerebral lesions with an early- or late-onset of cranial nerve deficits [7,8]. However, routine lateral cervical radiographs were unable to identify OCF in 96% of the reported cases [1,3,5]. Head injured patients with clinical manifestations of lower cranial nerve deficits or persistent severe neck pain are at risk of OCF, despite normal radiographic results [9]. Reformatted CT scans of the occiptial-C2 region should therefore be performed in traumatized patients who may have OCF.

Clinical manifestations in patients with OCF may include unexplained neck pain, occipitocervical motion impairment, cranial nerve palsies, spasmodic torticollis, retropharyngeal or prevertebral soft tissue swelling, and impaired consciousness [2]. Although fatal brain stem compression due to the progression of craniocervical instability has been reported in sporadic cases, over two-thirds of patients with OCF are expected to have favorable clinical outcomes [6].

OCF may occur after minor head injuries, and these patients may merely present with subtle neck pain, as observed in the case presented here. Such an isolated case of OCF can easily go unrecognized. Multiplanar reformatted CT examinations of the craniocervical regions are therefore imperative for establishing a definite diagnosis, especially in those patients with a history of high-energy, blunt trauma to the head and neck regions [5,8].

The actual incidence of OCF is probably much higher than previously proposed, because increasing numbers of OCF cases have been reported after routine use of CT scans in severely traumatized patients. In patients suffering from severe craniocervical trauma, the incidence of OCF has been reported to be around 4.2–4.4% in the era of CT scans [5]. With progress in contemporary CT scanning techniques, a further increase in the incidence of the OCF can be expected [7].

According to the classification proposed by Tuli et al, OCF can be divided into the following types: Type 1 (stable), undisplaced fracture; Type 2 (stable), displaced fracture with no ligamentous instability; and Type 3 (unstable), displaced fracture with ligamentous instability [3]. Type 1 and 2 fractures are thought to be stable because of the presence of intact alar ligaments and tentorial membrane. For patients with Type 3 fractures caused by rotation and lateral bending injuries, the contralateral alar ligaments and tentorial membrane may be injured, leading to progressive craniospinal instability.

Most OCF patients recover well with a hard collar or brace immobilization [2,3,8]. However, stable OCF may heal without the use of external immobilization to the neck [3], as observed in the case reported here. Nevertheless, it needs to be stressed that Type 3 OCF lesions should be treated with stricter external immobilization. Posterior occiput-cervical fusion has also been suggested for these patients [3]. Accordingly, treatment for OCF should be individualized based on the degree of craniocervical instability. Serial follow-ups with CT and magnetic resonance imaging examinations may help to assess the progress and integrity of the bony and ligamentous stability.

In summary, we report a rare case of an isolated unilateral OCF in a patient with a minor head injury. We emphasize the need for a high level of clinical suspicion for the diagnosis of this rare disease entity in traumatized patients with persistent neck pain, even in those with no obvious skull fractures or cranial nerve injuries.

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一位以少見的枕骨髁骨折表現之輕度頭部外傷病患

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枕骨髁骨折是一個少見但卻可能致命的疾病，通常它是發生在嚴重頭部外傷的病人身上。自從電腦斷層掃描的普及，使得早期的診斷變得容易一些。對於大多數穩定型的枕骨髁骨折病人，使用硬式的頸圈固定便足以產生堅固的骨融合。延遲診斷的病人，骨折的枕骨髁碎片可能產生位移而造成一些神經症狀的惡化。這裡我們提出一位以單獨枕骨髁骨折表現之輕度頭部外傷病患，我們要強調的是，即使在輕度頭部外傷的病患，如果有持續頸部疼痛症狀，對枕骨髁骨折抱著高度懷疑仍然是必要的。

關鍵詞：外固定，輕度頭部外傷，枕骨髁骨折

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